

Claims

We claim:

- 1 1. A purified polynucleotide molecule, comprising a nucleotide sequence that encodes
2 an oxalyl-CoA decarboxylase polypeptide, or a fragment of said oxalyl-CoA decarboxylase
3 that retains functional enzymatic activity.

- 1 2. The polynucleotide molecule according to claim 1, wherein said nucleotide
2 sequence is derived from *Oxalobacter formigenes*.

- 1 3. The polynucleotide molecule according to claim 1, wherein said nucleotide
2 sequence encodes a polypeptide comprising the amino acid sequence shown in SEQ ID NO.
3 4, or a fragment of said oxalyl-CoA decarboxylase that retains functional enzymatic activity.

- 1 4. The polynucleotide molecule according to claim 1, comprising the nucleotide
2 sequence shown in SEQ ID NO. 3.

- 1 5. The polynucleotide molecule according to claim 1, wherein said polynucleotide
2 molecule hybridizes under standard high-stringency conditions with a polynucleotide molecule
3 comprising the nucleotide sequence shown in SEQ ID NO. 3, or the complementary sequence
4 thereof.

- 1 6. The polynucleotide molecule according to claim 1, wherein said polynucleotide
2 consists of a nucleotide sequence that encodes oxalyl-CoA decarboxylase comprising the
3 amino acid sequence shown in SEQ ID NO. 4, or a fragment of said oxalyl-CoA
4 decarboxylase that retains functional enzymatic activity.

1 7. The polynucleotide molecule according to claim 6, wherein said polynucleotide
2 hybridizes under high stringency conditions with a nucleotide sequence comprising
3 nucleotides 181 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the
4 complementary sequence thereof.

1 8. The polynucleotide according to claim 6, wherein said nucleotide sequence consists
2 of nucleotides 181 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the
3 complementary sequence thereof.

1 9. A polynucleotide probe, comprising a nucleotide sequence that is substantially
2 complementary with a polynucleotide sequence present in an *Oxalobacter formigenes*
3 genome, wherein the polynucleotide sequence present in the *Oxalobacter formigenes* genome
4 comprises a gene selected from the group consisting of the formyl-CoA transferase gene and
5 the oxalyl-CoA decarboxylase gene.

1 10. A polynucleotide PCR primer, comprising a nucleotide sequence that is
2 substantially complementary with a polynucleotide sequence present in an *Oxalobacter*
3 *formigenes* genome, wherein said polynucleotide sequence present in said *Oxalobacter*
4 *formigenes* genome comprises a gene selected from the group consisting of the formyl-CoA
5 transferase gene and the oxalyl-CoA decarboxylase gene, and wherein said PCR primer is
6 capable of priming PCR amplification of said polynucleotide sequence present in said
7 *Oxalobacter formigenes* genome.

1 11. A method for detecting *Oxalobacter formigenes* in a sample, comprising the steps
2 of:

3 (a) contacting said sample with a polynucleotide probe according to claim 9 under
4 conditions sufficient for selective hybridization of said polynucleotide probe
5 with a DNA fragment specific for *Oxalobacter formigenes*; and

6 (b) detecting said probe hybridized to said DNA fragment.

1 12. A polynucleotide vector comprising a polynucleotide molecule according to claim
2 1.

1 13. The polynucleotide vector according to claim 12, wherein said polynucleotide
2 molecule consists of a nucleotide sequence that encodes an oxalyl-CoA decarboxylase
3 polypeptide comprising the amino acid sequence shown in SEQ ID NO. 4, or a fragment of
4 said oxalyl-CoA decarboxylase that retains functional enzymatic activity.

1 14. The polynucleotide vector according to claim 12, wherein said polynucleotide
2 vector hybridizes under high stringency conditions with a nucleotide sequence consisting of
3 nucleotides 181 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the
4 complementary sequence thereof.

1 15. The polynucleotide vector according to claim 12, wherein said nucleotide
2 sequence of said polynucleotide molecule consists of nucleotides 181 through 1884 of the
3 nucleotide sequence shown in SEQ ID NO. 3 or the complementary sequence thereof.

1 16. A recombinant host cell which comprises the polynucleotide vector of claim 12,
2 and wherein said cell expresses said oxalyl-CoA decarboxylase or a fragment of said oxalyl-
3 CoA decarboxylase that retains enzymatic activity.

1 17. The cell according to claim 16, wherein said polynucleotide vector hybridizes
2 under high stringency conditions with a nucleotide sequence consisting of nucleotides 181
3 through 1884 of the nucleotide sequence shown in SEQ ID NO. 3 or the complementary
4 sequence thereof.

1 18. The cell according to claim 16, wherein said nucleotide sequence of said
2 polynucleotide molecule consists of nucleotides 181 through 1884 of the nucleotide sequence
3 shown in SEQ ID NO. 3 or the complementary sequence thereof.